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NOTICE OF ALLOWANCE AND FEE(S) DUE

7590

01/20/2011

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EXAMINER

SHINGLETON, MICHAEL B

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 01/20/2011

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,499	02/20/2004	George Gustave Zipfel JR.	ZIPFEL 1	7599

TITLE OF INVENTION: SWITCHING AMPLIFIER FOR DRIVING REACTIVE LOADS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	\$755	\$0	\$0	\$755	04/20/2011

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

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If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

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III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

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01/20/2011

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New York, NY 10019-3775

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(Depositor's name)

(Signature)

(Date)

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10/783,499	02/20/2004	George Gustave Zipfel JR.	ZIPPEL 1	7599

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nonprovisional	YES	\$755	\$0	\$0	\$755	04/20/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
SHINGLETON, MICHAEL B	2815	330-010000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).	2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
<input type="checkbox"/> Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.	1_____
<input type="checkbox"/> "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a Customer Number is required.	2_____
	3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY AND STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): Individual Corporation or other private group entity Government

4a. The following fee(s) are submitted:

- Issue Fee
- Publication Fee (No small entity discount permitted)
- Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- A check is enclosed.
- Payment by credit card. Form PTO-2038 is attached.
- The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

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7590	01/20/2011		EXAMINER	
Ronald D. Slusky 353 West 56th St.-Suite 5L New York,, NY 10019-3775			SHINGLETON, MICHAEL B	
			ART UNIT	PAPER NUMBER
			2815	
				DATE MAILED: 01/20/2011

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 0 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 0 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability	Application No. 10/783,499	Applicant(s) ZIPFEL ET AL.
	Examiner Michael B. Shingleton	Art Unit 2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTO-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. This communication is responsive to the amendment dated 08-04-2010.

2. The allowed claim(s) is/are 1, 3-33, 63-69 and 79.

3. Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some* c) None of the:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. _____.

3. Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

(a) including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) hereto or 2) to Paper No./Mail Date _____.

(b) including changes required by the attached Examiner's Amendment / Comment or in the Office action of
Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. Notice of References Cited (PTO-892)

5. Notice of Informal Patent Application

2. Notice of Draftsperson's Patent Drawing Review (PTO-948)

6. Interview Summary (PTO-413),
Paper No./Mail Date _____.

3. Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____.

7. Examiner's Amendment/Comment

4. Examiner's Comment Regarding Requirement for Deposit
of Biological Material

8. Examiner's Statement of Reasons for Allowance

9. Other _____.

/Michael B Shingleton/
Michael B Shingleton
Primary Examiner
Group art Unit 2815

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Applicant in the amendment dated 8-4-2010 at least part of claim 16 is missing and claim 17-24 are entirely missing. The top part of the two papers has noted in writing that appears to be from the fax machine says that one page is 9/027 that has part of claim 16 and the next page noted as 010/027 starts with claim 25. Thus it is clear that if there was a missing page that this page was not received by the patent office and applicant may have lost the apparent page that had claim 16-24 thereon. But that said it is clearly apparent that applicant meant for these claims to be those as presented in the amendment of 12-14-2009. Claim 79 has been added as we have talked about previously.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The following claims are hereby presented and replaces all previous versions:

CLAIMS

1

- 2 1. ~~(Currently Amended)~~ Apparatus comprising
3 at least first and second reactive loads,
4 ~~a first circuit means that generates a first switching signal and includes switching~~
5 elements with respective control terminals,
6 ~~a second circuit means that generates a second switching signal and includes~~
7 switching elements with respective control terminals,
8 ~~means for generating a first PWM signal that includes a fundamental switching~~
9 ~~band signal component of the first switching signal and that further includes a baseband~~
10 ~~signal and for applying said first PWM signal to said control terminals of said first circuit~~
11 means,
- 12 ~~means for generating a second PWM signal that includes a fundamental switching~~
13 ~~band component of the second switching signal that has substantially the same magnitude~~
14 ~~and phase as the fundamental switching band component of said first PWM signal, and~~
15 ~~that further includes a baseband signal that is the inverse of said baseband signal that is~~
16 ~~included in the first PWM signal, and for applying said second PWM signal to said~~
17 ~~control terminals of said second circuit means,~~
- 18 means for generating first and second switching signals each having respective
19 switching-band components and at least one respective baseband component; and
20 means for applying said first and second switching signals to said first and second
21 reactive loads, respectively;
- 22 wherein the means for generating functions so as to work with the means for
23 applying to generate the switching signals in such a way that a) the sum of the values of
24 the instantaneous currents through said each load is substantially zero, b) substantially all
25 of said at least one baseband component of said first switching signal is a current that
26 flows into said first reactive load and c) substantially all of said at least one baseband
27 component of said second switching signal is a current that flows into said second
28 reactive load;
- 29 wherein at least one of said reactive loads is a transducer/capacitive load.

1

2. Canceled.

1
2 3. (Currently Amended) The invention of claim 1 wherein the first and
3 ~~said circuit means function so as to work with the means for generating a first PWM~~
4 ~~signal and with the means for generating a second PWM signal to generate the switching~~
5 ~~signals in such a way that a) the sum of the values of the instantaneous currents through~~
6 ~~said each load is substantially zero, b) substantially all of said at least one baseband~~
7 ~~component of said first switching signal is a current that flows into said first reactive load~~
8 ~~and c) substantially all of said at least one baseband component of said second switching~~
9 ~~signal is a current that flows into said second reactive load,~~

10 there are N of said loads and wherein for each of a number of signal variables for
11 each load, the sum of the values of each particular signal variable is substantially
12 constant.

1
1 4. (Currently Amended) The invention of claim 3 wherein there are N of
2 ~~said loads, wherein for each of a number of signal variables for each load, the sum of the~~
3 ~~values of each particular signal variable is substantially constant, and wherein said~~
4 number of signal variables is greater than 1 and less than N.

1
1 5. (Currently Amended) The invention of claim 1 wherein respective first
2 terminals of each of said ~~reactive~~ loads are connected to a common node through which
3 said current at baseband frequencies flows, said common node being connected to a fixed
4 potential.

1
1 6. (Currently Amended) The invention of claim 5 wherein each of said
2 reactive loads has a second terminal and wherein said apparatus further comprises means
3 for applying at least the baseband components of said first switching signal between the
4 second terminal of said first ~~reactive~~ load and said common node and for applying at least
5 the baseband components of said second switching signal between the second terminal of
6 said second ~~reactive~~ load and said common node.

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1 7. (Currently Amended) The invention of claim 1 further comprising a
2 mechanical load connected to said ~~transducer~~^{capacitive} load.

1 8. (Original) The invention of claim 7 wherein said mechanical load
2 includes means for generating acoustic sonar signals.

1 9. (Currently Amended) The invention of claim 1
2 Apparatus comprising
3 at least first and second reactive loads;
4 means for generating at least first and second switching signals, each having
5 respective switching band components and at least one respective baseband component,
6 means for applying said first and second switching signals to said first and second
7 reactive loads, respectively,
8 wherein the first and second circuit means function means for generating
9 functions so as to work with the means for generating a first PWM signal and with the
10 means for generating a second PWM signal applying to generate the switching signals in
11 such a way as to cause a) substantially the same amount of current at baseband
12 frequencies that flows out of one or more of said reactive loads at a given time to flow
13 into one or more of the others of said reactive loads, b) substantially all of said at least
14 one baseband component of said first switching signal to be a current that flows into said
15 first reactive load and c) substantially all of said at least one baseband component of said
16 second switching signal to be a current that flows into said second reactive load,
17 wherein at least one of said reactive loads is a transducer.

1 10. (Currently Amended) The invention of claim 9 further comprising
2 means for connecting respective first terminals of each of said reactive loads to a
3 common power supply node through which said current at baseband frequencies flows.

1 11. (Currently Amended) The invention of claim 10 wherein each of said
2 reactive loads has a second terminal and wherein said apparatus further comprises means
3 for applying at least the baseband components of said first switching signal between the

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4 second terminal of said first reactive load and said common node and for applying at least
5 the baseband components of said second switching signal between the second terminal of
6 said second reactive load and said common node.

1

12. (Withdrawn-Currently Amended) The invention of claim 11 wherein
2 said apparatus is further adapted to drive a third reactive load with a third switching
3 signal, said third switching signal having switching band components and at least one
4 baseband component, said third reactive load having a second terminal, and wherein said
5 apparatus further comprises means for applying the at least one baseband component of
6 said third switching signal between the second terminal of said third reactive load and
7 said common node.

1

13. (Currently Amended) The invention of claim 9 wherein said reactive
2 loads have substantially equal impedance and wherein said baseband components are the
3 inverse of one another.

1

14. (Currently Amended) The invention of claim 9 wherein said apparatus
2 further includes at least one power supply terminal and wherein said current flowing out
3 of one or more of said reactive loads flows away from said power supply terminal and
4 said current flowing into one or more of the others of said reactive loads flows toward
5 said power supply terminal.

1

15. (Original) The invention of claim 14 wherein the phases and amplitudes
2 of said baseband components are such that said currents add to zero at substantially all
3 times.

1

16. (Currently Amended) The invention of claim 14 wherein respective first
2 terminals of each of said reactive loads are connected to a common node through which
3 said current at baseband frequencies flows, said common node being at a fixed potential.

1

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1 17. (Original) The invention of claim 9 wherein there are two of said loads,
2 wherein said two loads have substantially equal impedances and wherein the baseband
3 components of said first and second switching signals are of substantially equal
4 magnitude and are substantially the inverse of one another.

1 18. (Withdrawn-Currently Amended) The invention of claim 9 wherein said
2 switching amplifier apparatus is further adapted to drive a third reactive load with a third
3 switching signal, wherein said first, second and third loads have substantially equal
4 impedances and wherein the baseband components of said first, second and third
5 switching signals are such that they add to zero at substantially all times.

1 19. (Previously Presented) The invention of claim 9 further comprising a
2 mechanical load connected to said transducer.

1 20. (Original) The invention of claim 19 wherein said mechanical load
2 includes means for generating acoustic sonar signals.

1 21. (Previously Presented) The invention of claim 9 wherein said apparatus
2 further includes at least first and second signal paths containing said first and second
3 loads, respectively.

1 22. (Original) The invention of claim 21 wherein alternating polarity
2 currents flow in said first and second signal paths in response to said first and second
3 switching signals, respectively.

1 23. (Original) The invention of claim 22 wherein said first and second
2 switching signals are generated in response to first and second pulse-width-modulated
3 signals, respectively.

1 24. (Previously Presented) The invention of claim 21 wherein said apparatus
2 further includes means for applying said first and second switching signals to said first

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3 and second signal paths, respectively, in such a way that at least one switching band
4 component of said first switching signal and at least one switching band component of
5 said second switching signal cancel each other and therefore are substantially isolated
6 from said reactive loads.

1
2 25. (Original) The invention of claim 24 wherein alternating polarity
3 currents flow in said first signal path in response to said first switching signal and
4 alternating polarity currents flow in said second signal path in response to said second
5 switching signal.

1
2 26. (Previously Presented) The invention of claim 24 wherein
3 said at least one switching band component of said first switching signal and said
4 at least one switching band component of said second switching signal are the
5 fundamental frequency components of said first and second switching signals,
6 respectively, and are of substantially the same amplitude and phase, and
7 said means for applying comprises a common-mode inductor in said first and
second signal paths.

1
2 27. (Withdrawn-Currently Amended) The invention of claim 21 wherein
3 said apparatus is further adapted to drive a third reactive load with a third switching
4 signal, wherein said switching amplifier includes at least a third signal path containing
5 said third reactive load, and wherein said apparatus further includes means for applying
6 said first, second and third switching signals to said first, second and third signal paths,
7 respectively, in such a way that at least one switching band component of each of said
8 first, second and third switching signals cancel each other and therefore are substantially
isolated from said reactive loads.

1
2 28. (Withdrawn) The invention of claim 27 wherein alternating polarity
3 currents flow in said first signal path in response to said first switching signal, alternating
polarity currents flow in said second signal path in response to said second switching

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4 signal, and alternating polarity currents flow in said third signal path in response to said
5 third switching signal.

1

1 29. (Withdrawn) The invention of claim 27 wherein
2 said at least one switching band component of said first, second and third
3 switching signals are of substantially the same amplitude and phase, and
4 said means for applying comprises a common-mode inductor in said first, second
5 and third signal paths.

1

1 30. (Currently Amended) The invention of claim 21 wherein
2 each of said reactive loads includes a first terminal and a second terminal,
3 the first terminals of each of said reactive loads are connected to a common node
4 through which said current at baseband frequencies flows, said common node being
5 adapted to be connected to a fixed potential,
6 each said path includes filtering circuitry connected to the second terminal of the
7 respective reactive load, and
8 each of said first and second switching signals comprises an alternating polarity
9 signal impressed across said first and second signal paths, respectively.

1

1 31. (Currently Amended) The invention of claim 21 wherein
2 each of said reactive loads includes a first terminal and a second terminal,
3 the first terminals of each of said reactive loads are connected to a common node
4 through which said current at baseband frequencies flows, said common node being
5 connected to a fixed potential,
6 each said path includes filtering circuitry connected to the second terminal of the
7 respective reactive load, and
8 said first and second switching signals comprise respective signals at first and
9 second potentials applied to the filtering circuitry of said first and second signal paths,
10 respectively.

1

1 32. (Currently Amended) The invention of claim 31 wherein

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2 said second potential is substantially equal to said fixed potential, and
3 said filtering circuitry includes at least one energy storage element that stores
4 energy when each said switching signal is at said first potential and that supplies energy
5 to said reactive loads when each said second node is connected to said second potential.
1

1 33. (Previously Presented) The invention of claim 32 wherein
2 said energy storage element is a common-mode inductor having first and second
3 ports in said first and second paths, respectively, and
4 said first and second switching signals have respective fundamental switching
5 band components that are of substantially equal magnitude and phase that are canceled by
6 said common-mode inductor.

1

34.-62. Canceled.

1 63. (Currently Amended) A switching amplifier operating at a particular
2 switching frequency, the switching amplifier comprising
3 at least first and second circuit paths,
4 each of said paths comprising switching circuitry, a load filter, a respective port of
5 a common-mode inductor and a transducer, all connected in series, each transducer
6 having a terminal that is connected to a power supply node in common with each other
7 transducer, each load filter having a passband that includes said particular switching
8 frequency and having a stop band at frequencies higher than said particular switching
9 frequency,
10 said switching circuitry being operative in response to a first pulse-width-
11 modulated signal to cause first and second voltages of a first switching signal to be
12 alternately impressed between the load filter of said first circuit path and said common
13 node and being further operative in response to a second pulse-width-modulated signal to
14 cause first and second voltages of a second switching signal to be alternately impressed
15 between the load filter of said second circuit path and said common node,
16 said first and second switching signals having respective fundamental switching
17 components that are of substantially equal magnitude and phase so that they are canceled

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18 by said common-mode inductor, said first and second switching signals each further
19 having at least one respective baseband component, the baseband components of said
20 first and second switching signals being such that substantially the same amount of
21 current at baseband frequencies flowing out of one or more of said transducers at a given
22 time flows into one or more of the others of said transducers, and
23 substantially all of said at least one baseband component of said first switching
24 signal being a current that flows into one of said transducers and substantially all of said
25 at least one baseband component of said second switching signal being a current that
26 flows into another of said transducers.

1

1 64. (Original) The invention of claim 63 wherein the phases and amplitudes
2 of said baseband components are such that said currents add to zero at substantially all
3 times,

1

1 65. (Previously Presented) The invention of claim 63 wherein said
2 transducers have substantially equal impedance and wherein said baseband components
3 are the inverse of one another.

1

1 66. (Previously Presented) The invention of claim 63 wherein said switching
2 amplifier includes at least one power supply terminal and wherein said current flowing
3 out of one or more of said transducers flows away from said power supply terminal and
4 said current flowing into one or more of the others of said transducers flows toward said
5 power supply terminal.

1

1 67. (Previously Presented) The invention of claim 63 wherein there are two
2 of said transducers having substantially equal impedances and wherein the baseband
3 components of said first and second switching signals are of substantially equal
4 magnitude and are substantially the inverse of one another.

1

1 68. (Previously Presented) The invention of claim 67 wherein a mechanical
2 load is connected to at least one of said transducers.

1

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- 1 69. (Original) The invention of claim 68 wherein said mechanical load
2 includes means for generating acoustic sonar signals.

70 - 78. Canceled

79. Apparatus comprising:

N reactive loads, wherein N greater than or equals to 2, N circuit means each of which generates a respective switching signal and includes switching elements with respective control terminals, N PWM generating means each for generating a respective PWM signal and for applying said respective PWM signal to said control terminals of a respective one of said circuit means, wherein each PWM signal includes a) a fundamental switching band signal component of a respective one of the switching signals, wherein the fundamental switching band signal components all have substantially the same magnitude and phase as one another and b) a baseband signal, wherein the baseband signals of the PWM signals add to zero at substantially all times, and wherein at least one of said reactive loads is a capacitive load.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael B. Shingleton whose telephone number is (571) 272-1770.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker, can be reached on (571) 272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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MBS
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